



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

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August 5, 2010

Ref: 8EPR-N

Mr. Aaron Snyder  
St. Paul District  
U.S. Army Corps of Engineers  
190 E. 5th St., Suite 401  
St. Paul, MN 55101

Re: Fargo-Moorhead Metro Area  
Flood Risk Management  
FR/DEIS # 20100210

Dear Mr. Snyder:

The U.S. Environmental Protection Agency, Regions 8 and 5 (EPA) have reviewed the U.S. Army Corps of Engineers (Corps) Draft Feasibility Report and Environmental Impact Statement (FR/DEIS) for the Fargo-Moorhead Metropolitan Area Flood Risk Management project. EPA offers these comments in accordance with the Agency's responsibilities under the National Environmental Policy Act (NEPA), 42 U.S.C. Section 4332(2)(C) and Section 309 of the Clean Air Act, 42 U.S.C. Section 7609.

The majority of the Fargo-Moorhead metropolitan area is located in the floodplain of the Red River of the North and several tributaries. The proposed project is to reduce flood risk and flood damages. EPA has participated throughout the development of this project and we agree with the Corps that an action alternative is necessary to reduce flood risk and flood damages and to improve public safety.

The FR/DEIS fully analyzes three alternatives: No Action – continue emergency measures, a North Dakota diversion channel alternative and a Minnesota diversion channel alternative. Both diversion channel alternatives have a capacity of 35,000 cubic feet per second (cfs). The North Dakota diversion channel (ND 35K) which is also the Locally Preferred Plan alternative (LPP), has been identified by the Corps as the tentatively preferred alternative in the FR/DEIS. The Minnesota alternative (MN 35K) is also referred to as the Federally Comparable Plan (FCP).

The following bullets summarize EPA's concerns about the proposed project and our recommendations to improve the environmental analysis and mitigation measures. EPA's specific comments on the FR/DEIS start on page 5 of this letter.

### **EPA Concerns:**

- The information provided in the Clean Water Act (CWA) § 404(b)(1) analysis does not fully support the conclusion that the ND 35K alternative (the tentatively selected preferred alternative) is the least environmentally damaging practicable alternative (LEDPA). This alternative impacts substantially more wetlands and riparian areas than the MN 35K alternative.
- The broad-based non-structural alternative described in Appendix P. and various scoping meetings appears to have been eliminated from the tentatively selected preferred alternative. The broad-based non-structural alternative measures will be important in maintaining the sustainability of flood protection in the Fargo-Moorhead area and limiting development in flood prone areas.
- The flood flow rates used to develop the proposed flood protection measures and determine environmental impacts have changed several times as the FR/DEIS was being prepared. As a whole, the project and analysis is much improved with the recalculation of flood rates, however the document is difficult to follow and it is often unclear which flood rates were used for the impact analysis.
- The impact analysis of the proposed alternatives on downstream flooding is incomplete because of the revisions to the flood flows mentioned above.
- The FR/DEIS did not include the environmental impacts of induced growth from changes to the regulatory floodplain.
- The mitigation and monitoring plans for the project are largely undefined.

### **EPA Recommendations:**

- The CWA §404(b)(1) analysis needs to be revised to include a complete description of the decision process which resulted in identification of the tentatively preferred alternative, ND 35K. This documentation should include descriptions of the alternatives analyses, practicability determinations, and consideration of local preferences for both the ND 35K and MN 35K diversion channel alternatives.
- The broad-based non-structural alternative needs to be more fully developed and implemented as part of the selected diversion channel alternative.
- The revised impact analysis of the diversion channels on downstream flooding needs to be recalculated and mapped based on the new flows and distributed to the public and government agencies prior to issuing the FEIS.
- The environmental analysis needs to be updated or referenced to the recalculated flood discharge rates.



- Draft mitigation and monitoring plan(s) should be included in the FEIS identifying which measures are required, who will be implementing and funding the measures and identifying the criteria that will be used to determine success. Further, a monitoring and adaptive management program should be created to ensure mitigation measures are implemented effectively. Public participation and accountability should be included as part of these plans.
- The environmental analysis needs to look at the indirect impacts of the project such as inducing development in the former 100-year floodplain. The main areas of indirect impacts are wetland losses, loss of flood storage areas, and loss of riparian habitat. Ironically, the diversion channels will also increase development in the floodplain, increasing the area that may need to be protected during major flood events.
- The document should include a cumulative impacts analysis of other projects in the basin or affecting the basin including, but not limited to, Devil's Lake Outlet, which contributes or will contribute to flows into the Sheyenne River or other tributaries of the Red River during seasonal high flows.

**Rating:**

EPA's comments are based on the FR/DEIS and appendices that we received in June 2010. During our review of the FR/DEIS, we have also been discussing preparation of updated designs, revised analysis and development of the mitigation plan. We understand the tight schedule for construction of the Fargo-Moorhead flood control project has necessitated issuance of iterative versions of the feasibility studies, design plans and environmental analysis. However, we are concerned that the public and participating agencies may not have a full opportunity to review and comment on the major studies being prepared between the DEIS and FEIS. We recommend that the mitigation plan, downstream flooding analysis and fuller development of the non-structural alternatives be released to the public and agencies for comment prior to incorporating the information into the FEIS.

Pursuant to EPA policy and guidance, EPA rates the environmental impact of an action and the adequacy of the NEPA analysis. Since the Corps has "tentatively" identified a preferred alternative, EPA is rating each alternative presented in the FR/DEIS. Based on our review of the FR/DEIS and 404 (b)(1) analysis, we are rating the FR/DEIS as "EO-2" (Environmental Objections-Insufficient Information). The "EO" rating is based on impacts to wetlands and riparian areas. The "2" rating is based on the need for clarification or disclosure of information and the need for a final mitigation plan to accompany the Final EIS. A description of EPA's EIS rating system is also enclosed.

Thank you for considering our input. We would like to schedule a telephone call with the Army Corps of Engineers to discuss the concerns raised in this letter. If you have any questions regarding our comments, please call me at (303) 312-6004 or you may contact Dana Allen of my staff at (303) 312-6870. You may also contact Ken Westlake in Region 5 at (312) 886-2910.

Sincerely,



Larry Svoboda  
Director, NEPA Program  
Office of Ecosystems Protection and Remediation

**EPA's Comments on the  
Fargo-Moorhead Draft Feasibility Report and  
Environmental Impact Statement (FR/DEIS)  
August 5, 2010**

**Background**

The majority of the Fargo-Moorhead metropolitan area is located in the floodplain of the Red River of the North and several tributaries. The Red River has exceeded the National Weather Service flood stage of 18 feet in 47 of the past 108 years, and every year from 1993 through 2010. Although emergency measures have been successful, future average annual flood damages in the Fargo-Moorhead are estimated at \$195.9 million without an extensive flood control project.

The purpose of the proposed project is to reduce flood risk and flood damages in the Fargo-Moorhead Metropolitan area. The project will also restore or improve riparian habitat, increase wetland habitat and provide recreational opportunities. The FR/DEIS fully analyzes three alternatives: No Action – continue emergency measures, a North Dakota diversion channel and a Minnesota diversion channel. Both diversion channel alternatives have a capacity of 35,000 cubic feet per second. The Locally Preferred Plan alternative, the North Dakota 35K diversion channel, has been identified by the Corps as the tentatively preferred alternative in the FR/DEIS.

**ND 35K**

Locally Preferred Plan (LPP)  
North Dakota, west of Fargo  
36 miles long diversion channel  
18 hwy bridges, 4 railroad bridges  
5 control structures at :  
Red, Wild Rice, Sheyenne, Maple, Rush  
and Lower Rush Rivers

**MN 35K**

Federally Comparable Plan (FCP)  
Minnesota, east of Moorhead  
25 miles long diversion channel  
20 highway bridges, 4 railroad bridges  
Red River control structure

**Wetlands**

***Clean Water Act § 404(b)(1) Analysis***

1. The FR/DEIS includes a preliminary Clean Water Act (CWA) § 404(b)(1) Guidelines Evaluation in Attachment 1. The CWA § 404 (b)(1) analysis is used to determine the Least Environmentally Damaging Practical Alternative (LEDPA) under CWA § 404. The CWA § 404(b)(1) Guidelines state “no discharge shall be allowed if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem (waters of the U.S.) so long as the alternative does not have other significant adverse consequences” 40 C.F.R. 230.10(a).



The information provided in the CWA § 404(b)(1) analysis does not fully support the conclusion that the ND 35K alternative (the tentatively selected preferred alternative) is the LEDPA. The Corps needs to provide additional detail and discussion to justify why they believe the MN alternative (the FCP or NED) is not practicable. It appears that the MN 35K (FCP) alternative was not included in the § 404(b)(1) analysis because the FR/DEIS and § 404(b)(1) analyses used two different project purpose statements, with the project purpose statement for § 404(b)(1) specifically and additionally including reducing flood risk, flood damages and flood protection costs related to flooding of the ND tributaries. It is our understanding from discussions with the Corps that the MN alternative was not considered practicable for other reasons independent of either stated project purpose. In accordance with the Guidelines, an alternative is considered practicable if it is available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes.

The CWA § 404(b)(1) analysis needs to be revised to include a complete description of the decision process which resulted in identification of the tentatively preferred alternative. This documentation should include description of all FR/DEIS alternatives analyses (including the non-structural alternative measures associated with the MN 35K), practicability determinations, and consideration of local preferences. The burden of proof to demonstrate compliance with the Guidelines rests with the Corps, and sufficient information must be provided in the analysis (40 CFR 230.12(a)(3)(iv)). The § 404(b)(1) analysis needs to include additional documentation to substantiate the Corps' position that the ND 35K is the LEDPA. While this information may be available in other parts of the document, it needs to be presented in the context of the § 404(b)(1) analysis to substantiate the Corps conclusions.

2. The CWA § 404(b)(1) evaluation refers to the National Economic Development (NED) Plan, currently the Minnesota 40K alternative. However, the NED alternative was not analyzed in the FR/DEIS. The MN 35K (FCP) and the ND 35K (LPP) are the only alternatives fully analyzed in the FR/DEIS. We recommend that the alternatives discussed in the § 404(b)(1) evaluation be consistent with the FR/DEIS.

### ***Wetlands -- Environmental Analysis and Mitigation***

3. As described on page 260 in the mitigation section of the FR/DEIS, much of the proposed mitigation for riparian and geomorphic impacts is undefined. The FR/EIS identifies mitigation opportunities within the diversion channel for wetland impacts. However, this mitigation will not be appropriate for providing in-kind mitigation for impacts to forested wetland acres. Additionally, the Corps must also ensure that the suite of chemical, physical and ecological functions provided by the impacted wetlands are appropriately characterized and replaced. In order to do this, the Corps will need to provide a thorough analysis of the functions of the affected wetlands and riparian areas and identify in the mitigation plan how these functions will be mitigated. The mitigation plan should be consistent with the joint EPA, Corps Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (2008).



We recommend that the FEIS include a full wetlands impact analysis, including a preliminary wetlands mitigation plan outlining the replacement ratios and availability of sites for in-kind mitigation.

4. In addition to wetlands mitigation options within the diversion channel, we recommend that additional mitigation opportunities for impacts to waters of the United States be identified and pursued in the upper watersheds of the Red, Wild Rice, Sheyenne, Maple and Rush river systems. These could include conversion of prior converted croplands back to wetlands and ponds (which will also assist in the retention of water in the watershed), and reversing the trend of the hydrograph toward more water.
5. For the ND 35K alternative, we note that the majority of the wetlands mitigation is proposed to take place in the diversion channel after intercepting the Rush and Lower Rush Rivers. We recommend that the expanded wetland analysis examine this area and other areas north and south of the Cities of Fargo and Moorhead for areas suitable for flood storage to mitigate the increase in flooding that would result from the proposed diversion channels. Looking at the flood depth maps and the areal extent of previous flooding, it appears that many of these areas have traditionally functioned as flood storage areas. These areas may also provide appropriate sites for forested wetland mitigation. The analysis should also look at the feasibility of modifying the proposed diversion channel in undeveloped areas, so that some areas of the channel bottom could revegetate with trees and shrubs.
6. The impact analysis for wetland losses underestimates direct impacts by separating construction impacts and permanent impacts and overestimates construction and indirect impacts caused by the channel by using a 2,000 foot width of disturbance to estimate wetland impacts. The analysis does not include the impacts from induced growth or the impacts of diverting flow from the Maple, Sheyenne and Rivers. The table below summarizes wetland impacts from the FR/DEIS:

	MN 35K (FCP)	ND 35K (LPP)
<b>Wetland losses</b>		
Permanent (channel footprint), direct impact	17 acres	32.5 acres
Wetlands within 5250' corridor Mix of direct construction (temporary), and indirect (2000 foot width likely over estimated impacts )	85 acres	192 acres Does not include Rush Rivers de-watering and reduced flows for Maple and Sheyenne Rivers
	[ Width of Disturbance $\approx$ 2,000' ]	
Indirect from induced development	Not included in FR/DEIS	Not included in FR/DEIS

We recommend that the analysis of direct wetlands impacts be revised to include construction impacts in the direct impacts. Further, these direct impacts should be divided into temporary (construction) and permanent (footprint of project) wetland losses.

Typically, indirect impacts would be those wetland losses that occur later or at locations not in the project area as a result of the project. For infrastructure projects, most indirect impacts stem from induced growth. By removing a substantial area of the community from the hundred year floodplain, additional and/or more rapid development will occur. This development will cause additional wetland impacts because of directly filling wetlands or draining wetlands for development.

7. Other likely indirect impacts would be from the diversion channel intercepting or cutting off wetland water sources. For example, it appears that there will be substantial wetland impacts from intercepting the flows into the Rush Rivers below the diversion channel, as described on page 201 of the FR/DEIS. The diversion channel may also block groundwater flow into this wetland area, depending on whether groundwater is a major source of water for the wetland system.
8. Table 16 -- Effectiveness in meeting planning objectives (page 80 FR/DEIS), lists the MN 35K as providing 1090 additional acres of wetlands. The North Dakota alignment would provide 593 additional acres of wetlands. The FEIS should clarify the source of these numbers and the reason for the large difference.

### **Design Flows for Flood Protection**

Preparation of the FR/DEIS and impact analysis information have generated a lot of new analysis to quantify the appropriate design flood flow events for the Red River of the North. The FR/DEIS and the studies supporting the FR/DEIS have been in development during the same time frame as the new flood flow analysis. Overall, the recalculation of flood flow rates, in particular from the expert panel, will result in much better flood protection, improved design and a more sustainable flood control. However, it appears that much of the FR/DEIS impact analysis was prepared based on modeling using the 2009 flood stage as the equivalent of the 1% (100-year) flood event flow. The peak flood flows have been revised upwards to take into account climatic wet and dry cycles. The table below summarizes some of the different flood flow rates that have been used in developing the analysis for the Fargo-Moorhead flood control improvements and FR/DEIS.

	1% Chance (100- yr)		0.5% Chance (500-yr)	
	Stage at Fargo	Flow Rate (cfs)	Stage at Fargo	Flow Rate (cfs)
National Weather Service flood stage	18'			
FEMA (current)	38.3'			
FEMA (proposed)	39.3'			
2009 flood (Phase 3 feasibility study)	40.82'	29,400	46.7'	61,700
Expert Opinions – wet year	42.4'	34,700		



9. The FEIS should summarize the flood flows that will be used for the design of the proposed project and flood control efforts in the Fargo-Moorhead area. The FEIS also should note throughout the document which flow rates/flood stage were used in determining the impacts of the proposed project and determine whether the existing analysis needs to be updated for the new flood flows and stages. In particular, as noted in the FR/DEIS on page 145, the impact analysis for downstream water quantity will need to be revised in the FEIS to reflect new flow information and to analyze impacts from 0.5% probability (500-yr) flood.
10. The revised flow rate discussion should also disclose the various flood flow rates and stages that are being (will be) used for local, state, and FEMA flood protection efforts. The discussion should also address whether the revised flood stage numbers will change the local subdivision regulations and land use planning. (See also comments below regarding non-structural alternative).
11. The FEIS should discuss the pros and cons of designing a diversion channel for the approximately 1% probability (100-yr) flood event. This discussion should look at some of the other storm events such as the 700 -year flood level used in Winnipeg. We understand that level of flood protection is unlikely to be implemented solely by the Corps. However, it appears that additional flood protection can be gained by combining some of the measures from the non-structural alternative with a diversion channel alternative. [For example, will communities continue to raise or flood-proof new construction in case there is a greater than 1% (100-year) flood event or if the climatic wet cycle continues to increase flood discharge rates. ]
12. Devil's Lake basin is currently experiencing rising waters and there is a renewed urgency to lower water levels. New proposals have been developed recently to increase discharges from Devil's Lake into the Sheyenne River. To the extent feasible, the FEIS should analyze the potential impacts of increased flow to the proposed project and flooding in the Fargo-Moorhead area.

### **Non-Structural Alternative**

#### ***Sustainability and Preservation of the Floodplain***

Over the last one hundred years, a series of flood control projects have been constructed to reduce flood risk for the Fargo-Moorhead area. In the long term, none of these flood protection measures have maintained the desired level of flood protection. Many of these previous flood control projects have been undermined by development in flood-prone areas, re-building in flood prone areas, and agricultural and development activities which eliminate flood storage and increase peak flows. Climatic cycles have also affected flooding. New flood control projects often have the effect of increasing development in flood prone areas. We anticipate that more flood prone areas in metropolitan Fargo-Moorhead will be developed as a result of the project changing the regulatory floodplain and zoning and building requirements.

13. Even if the new flood diversion channel is constructed, the Fargo-Moorhead area will continue to experience some flooding due the topography of the Red River Basin. As noted on page 235, Figure 82, there will still be substantial flooding north and south of Fargo



during the 500-year storm. Flooding will continue along all rivers during larger flood events. We are therefore, very concerned to see that the non-structural alternative has been dropped from the tentatively preferred alternative, in Section 3.11.1.2, page 89. It was our understanding from earlier discussions that the non-structural alternatives would be carried through and implemented along with the selected "structural" alternative. All of the measures listed on page 4 of Appendix P – Non-Structural should be implemented along with the "construction alternatives"; such as:

- Floodplain regulation and floodplain management,
- Coordinate with the National Flood Control Insurance Program,
- Watershed/floodplain land use planning,
- Land development redirection
- Raise buildings above a particular flood elevation
- Restore natural and beneficial floodplain functions

The "non-structural" alternative in the FR/DEIS also seems to have been modified from the initial concept of preserving and maximizing flood protection in the entire Fargo-Moorhead Metropolitan Area, as discussed in earlier interagency meetings and Appendix P. In the FR/DEIS, the non-structural alternative focuses on construction actions for buildings identified in two specific areas northwest and south of Fargo to increase flood protection for the MN 35K alternative.

We therefore recommend that the non-structural alternative described in Appendix P and other project meetings be fully integrated into the flood diversion channel project. We understand that the Corps will not be implementing and funding much of the non-structural alternative; however, the long-term success of the Corps' flood control project will be dependent on successful implementation of the non-structural alternative.

14. The non-structural alternative should be more fully developed. For example, will all or some of the measures listed on page 4 of Appendix P be implemented, what entities will be responsible for implementing the measures and how will the measures be funded? The non-structural alternative should incorporate the measures that have already been implemented by state and local governments updated to reflect changes that are anticipated as a result of the diversion channel. The expanded alternatives discussion should disclose how local and Federal Emergency Management Agency (FEMA) floodplain ordinances and building restrictions will be affected by the revised floodplain delineation that will result from construction of one of the diversion channels.
15. Implementation of the non-structural alternative should correlate with the additional analysis on indirect impacts (discussed below), as the level of induced growth in flood prone areas will vary depending on the implementation of the non-structural alternative. The Corps may want to consider using an expert panel to envision how the non-structural alternative will be implemented in the planning time frame (e.g., 20 years in the future). The indirect impact analysis would be based on that combination of future development and non-structural flood control policies and projects.



16. Among the more important of the non-structural alternative measures listed on page 4 of Appendix P are: continuation of floodplain regulations and floodplain management, restoring natural and beneficial floodplain function, coordination with the national flood insurance program, and land development redirection. We also recommend limiting any new land drainage activities that could increase peak flows, unless the increase in peak flow could be offset through mitigation.
17. We also recommend that the non-structural alternative be modified to focus on future and ongoing activities instead of focusing on existing buildings with a high risk of flooding. How will the cities, towns and counties reduce or eliminate flood risk for new development, or major renovations of existing development?
18. The FEIS should also discuss how the flood diversion channel and non-structural alternatives will be implemented. Who will manage the diversion structures and channel? What will be the funding and organizational structure of this flood control district? Who will be maintaining the riparian habitat and flood carrying capacity of the existing floodplains of the Red River of the North and Fargo-Moorhead tributaries?
19. This project will provide one of the best opportunities to accelerate implementation of the objectives and recommendations of the International Red River Board (IRRB) <sup>1</sup> in the Fargo-Moorhead Area. We suggest that the recommendations of the IRRB be more directly incorporated into the non-structural alternative. Of course, the proposed project will meet the International Joint Commission (IJC) Recommendation #4: to implement flood protection measures for the Fargo-Moorhead area. In particular, we recommend that the analysis of the non-structural alternative evaluate how well the proposed non-structural measures will achieve Recommendation 26:  
Governments at all levels should undertake the following measures:
  - a. Develop and implement comprehensive, multi-faceted plans for concurrently reducing flood damage and protecting and enhancing the natural environment; and
  - h. Integrate floodplain management activities into the broader field of watershed and basin management.

### **Increased Downstream Flooding**

Page 81 (alternatives comparison) and Section 5.2.1.4 –Downstream Water Quantity on Page 145 have placeholders for revising the analysis of downstream flooding impacts. It is unclear which flood discharge rates were used to determine the increase in flood stages caused by the proposed alternatives and the maps of the areas which will be affected by increased downstream flooding.

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<sup>1</sup> "How Are We Living with the Red?", R. Halliday & Associates, June 2009, <http://www.ijc.org/php/publications/pdf/ID1633.pdf>; and "Living with the Red – A Report to the Governments of Canada and the United States on Reducing Flood Impacts in the Red River Basin", November 2000, <http://www.ijc.org/php/publications/html/living.html>



20. The increased downstream flooding impact analysis needs to be revised based on the recalculated flood flow rates as determined by the expert panel. The revised analysis should be released to the public and other agencies well before the FEIS is issued.
21. Mitigation should be developed to reduce the higher peak flows caused by either of the proposed diversion channels. This mitigation might include provisions such as leasing farm fields during the peak runoff or the use of recreation fields or golf courses to store flood waters and reduce peak flood flows.
22. The analysis in Section 5.2.1.4 Downstream Water Quantity should be expanded to include the impacts of the proposed project during a 500-year flood event for both alternatives.

### **Changes in Hydrology, Geomorphology**

23. The proposed flood diversion channel will greatly change the flow pattern and quantity of flow for all the diverted or partially diverted rivers. The FEIS should add mitigation measures to compensate for the abandonment of 2.7 miles of the Rush River and 3 miles of the Lower Rush River (Table 46). Although the Rush and Lower Rush Rivers have lower quality aquatic habitat and less abundant aquatic life than more natural streams, the loss of 5.7 miles of aquatic/riparian habitat still needs to be mitigated. The proposal to offset the loss of these tributaries through a meandering channel at the bottom of the diversion channel (page 266) needs to be developed sufficiently to determine the potential aquatic life and riparian habitat functions and values of the channel. There is little information in the FR/DEIS about the design and biological functions of the North Dakota diversion channel after intercepting the Rush and Lower Rush Rivers. Based on that limited information (e.g., the cross-section view of the channel, vegetation restrictions and channel description), it appears that the aquatic habitat values of the diversion channel might be rather limited. Additional information is needed to determine if the diversion channel can compensate for the loss or part of the loss of the Rush and Lower Rush Rivers.
24. Additional mitigation options should be pursued for adverse effects on stream geomorphology. While the 50% and 20% flow events will maintain transport of finer sediments, larger flow events may be required to sustain long-term geomorphic channel functions. Monitoring and mitigation options that consider these long-term functions should be incorporated as part of any updated mitigation plan. Also, it is unclear why riparian buffer establishment and restoration is proposed as mitigation for stream geomorphic impacts. Proposed mitigation should offset the functions lost by the proposed action. Riparian buffers do little to transport instream sediments and maintain substrate heterogeneity in streams.
25. The FEIS should include mitigation measures to offset the impacts of reducing flood flows to the equivalent of the 2-year storm for the Sheyenne and Maple Rivers. For example, is it possible to convey the equivalent of the 100-year storm from the diversion channel through the Sheyenne and Maple Rivers to maintain the floodplain and potentially reduce



downstream effects of the diversion channel? The purposes of the mitigation measures would be to maintain existing flood conveyance capacities of these rivers and consequent condition of riparian and wetlands habitat.

26. Significant geomorphic impacts are not anticipated for the Sheyenne and Maple Rivers and mitigation costs are not included in the cost estimates. We recommend modifying the cost estimates to include long-term monitoring of stream geomorphology and sediment movement, as these potential effects are likely to occur gradually and may not be detected for several years.
27. On page 108, first paragraph, the Wild Rice River is identified as having "a greater sediment transport capacity of coarser material that exerts a bigger control on channel morphology." However, the impacts of diverting a portion of the Wild Rice River and sediment were not included in the Environmental Consequences, Section 5.2.1.3 Sediment and Erosion. The FEIS should include a discussion of potential impacts of diverting a portion of the sediment load on the downstream stream morphology of the Wild Rice River and Red River.

### **Indirect Impacts of Reducing the Floodplain**

The FR/DEIS indicate that all of the diversion channel alternatives are expected to have a beneficial effect on the growth and development of the Fargo-Moorhead Metropolitan area. This beneficial effect is expected to be greater for the North Dakota alignment because it removes a much larger area from the existing floodplain.

The FR/DEIS (Section 5.2.3.2.1, page 213) also indicates that developable lands within the project area will retain or increase in property value through removal of flood risk damage, there would no longer be a need to raise or flood-proof new construction, and that new development or intensification of existing development should be pursued only in a manner that retains awareness and sensitivity to the residual flood threat.

This indirect impact analysis is important for two reasons. First, the environmental analysis (FEIS) should include a comprehensive analysis of indirect impacts to resources (i.e., wetlands) as a result of the proposed flood control project. The results obtained in this analysis will aid in identifying the resources of concern to concentrate on when preparing the cumulative impacts analysis for the proposed project. Secondly, this discussion is an important tool (i.e., land use planning, zoning, etc.) for presenting the entire array of flood control and protection measures that are available to protect the metropolitan area. This analysis should directly correlate with the non-structural alternative, taking into account the likelihood of implementation of the various measures under the non-structural alternative. Implementation of the various flood control measures may vary from area to area and jurisdiction to jurisdiction. In summary, we believe that the indirect impact analysis developed in conjunction with the implementation plans for the non-structural alternatives will provide important information to the decision maker and local communities to reduce both flood risks and environmental impacts.



28. The FEIS should disclose the impacts of new growth and particularly growth induced by improved flood protection. The issues or resources that are most likely to be affected by growth are: additional wetland and riparian habitat losses, loss of prime farmland, increased peak flows from suburbanization, and loss of floodplain or floodwater storage areas.
29. More specifically, we recommend the FEIS disclose the potential indirect impacts associated with growth and development by addressing the following:
- What, if any, measures have local communities implemented or plan to implement (i.e., land use plans, zoning, regulations, etc.) to protect and enhance resources of concern in their community and when are these measures expected to be implemented? We recommend that this type of information be included in the more fully developed non-structural alternative plans.
  - Types of new development (i.e., residential, commercial, industrial, recreational, etc.) that might take place in the more developable area;
  - Ordinances, etc. protective of natural resources located in the developable area(s); and
  - Whether existing public facilities (i.e., wastewater treatment plant, police and fire protection, etc.) will be able to handle proposed development.
30. The FEIS should also analyze the impacts of increased development in flood prone areas with potentially less flood protection than much of the existing development in Fargo and Moorhead. For example, we understand that new development will no longer be required to flood proof or elevate above the flood stage. If a flood event greater than the 1% probability (100-yr) occurs, then the new developments could be more likely to be flooded.
31. Looking at the backwater analysis, it appears that the 1% probability (100-year) flood stage elevation will decrease significantly as a result of constructing one of the proposed diversion channels. How will development be affected by the changes in flood elevations for FEMA flood insurance maps and local building and flood control ordinances?
32. The indirect impact analysis should also include impacts from the tributary diversions for the North Dakota alternative. The channel will divert most of the flood flow from the Maple and Sheyenne Rivers. Only the equivalent of the 50% (2-yr) to 33% (3yr) probability flood flows will continue downstream of the diversion channel. How will the diversion of peak flood flows affect development in the historic Sheyenne and Maple River floodplains? In particular, it appears that new development or expanded development could be built closer to the Maple River and Sheyenne River affecting floodplains and riparian areas. The new development may also be less protected from flooding due to changes in building codes and ordinances. Similarly, the Lower Rush and Rush Rivers will be completely diverted into the diversion channel with no downstream flow. From the FR/DEIS, it appears that much of the area between the Lower Rush and Rush Rivers is wetlands. How will the diversion of these two rivers affect potential development or farming practices in this area?



33. The indirect impact analysis should also include the provisions of Executive Order 11988. Using the procedures described in "Further Advice on Executive Order 11988 Floodplain Management", Interagency Task Force on Floodplain Management, 1987, the indirect impact analysis should address induced development in the floodplain and in flood storage areas.

### **Environmental Justice**

34. The environmental justice (EJ) analysis should be expanded north to include the areas that will have increased flooding as a result of the proposed diversion channel. For example, are there any potential EJ communities in Harwood, Argusville or Georgetown?
35. The EJ analysis should also look in more detail at the areas identified as potential environmental justice communities illustrated in Figures 82, 84, 85 and 86. In particular, several areas have been identified as having higher than average percentages of minority populations compared to county averages along the Minnesota alignment. There are also two areas adjacent to the proposed diversion channel alignment in West Fargo with higher than average percentages of minority populations. We recommend that the FEIS look at these areas in more detail to determine the nature of the potential EJ community, the proximity of the potential EJ community to the proposed diversion channel, and how the project may impact the population. For example, looking at aerial photographs, it appears that there is a small subdivision located in the vicinity of 40th Street North and 70th Ave North (Co Hwy 95) in one of the potential EJ areas (Clay County). Other Minnesota areas identified as potential EJ communities appear to have only one or two dispersed farm houses. The more detailed analysis should identify if any special outreach measures are needed to explain the potential impacts of the proposed diversion channel such as construction disruption, noise and fugitive dust. The diversion channel may also adversely affect the mobility of these communities to connect to jobs, schools and other members of the community.

### **Additional Comments**

36. We recommend adding plan views of the Wild Rice River diversion structure and channel for different flow scenarios to the FEIS. This information would be similar to the conceptual views shown in FR/DEIS Figures 17-23 for the Maple and Sheyenne Rivers.
37. We recommend expanding Table 38 -- Hydraulic data for the Wild Rice River tributary structure, on page 204 to include flood events greater than the 5-year flood event. We understand from discussions with the Corps, that the diversion channel will divert only a portion of flood flows and the Wild Rice River will continue to convey some flood flows.

38. Major construction projects such as the proposed diversion channels can have significant local air impacts from construction equipment diesel engines. We recommend that air quality mitigation measures such as the following, be incorporated into the construction contracts.

- Prohibit unnecessary idling of construction equipment;
- Require use of low-sulfur fuel;
- Locate diesel engines as far away as possible from residential areas;
- Locate staging areas as far away as possible from residential uses;
- Require heavy construction equipment to use the cleanest available engines or be retrofitted with diesel particulate control technology;
- Use alternatives to diesel engines and/or diesel fuels such as: biodiesel, liquid natural gas (LNG) or compressed natural gas (CNG), fuel cells, and electric engines;
- For winter time construction, install engine pre-heater devices to eliminate unnecessary idling;
- Prohibit tampering with equipment to increase horsepower or to defeat emission control devices effectiveness;
- Require construction vehicle engines to be properly tuned and maintained; and
- Use construction vehicles and equipment with the minimum practical engine size for the intended job.